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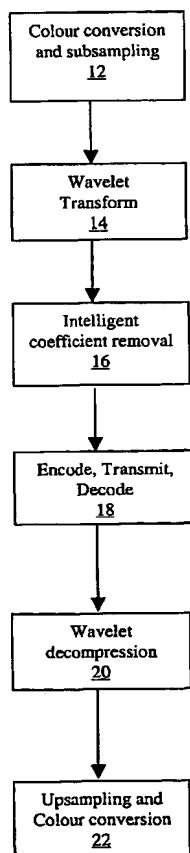
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(54) Title: DATA COMPRESSION FOR COLOUR IMAGES USING WAVELET TRANSFORM



(57) Abstract: The invention describes a wavelet compression method for colour converted image planes (Y, Cb and Cr), wherein a relatively low (e.g. zero) degree of compression is performed in areas of an original colour image having relatively higher importance, and a relatively higher degree of compression in those areas indicated to be of lower importance. It performs a hierarchical encoding of a reduced wavelet image by discarding wavelet coefficients which satisfy the two criteria of firstly corresponding to image areas of relatively lower importance and secondly being below a certain wavelet coefficient threshold. The wavelet coefficient threshold is determined from a calculation of cumulative histogram to remove a percentage of the image and can be specified as an input parameter by a user.



WO 03/090471 A1



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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|---------------------------------|
| Y A | US 2001/024529 A1 (CHAO HONGYANG ET AL) 27 September 2001 (2001-09-27) cited in the application abstract page 1, paragraph 12 page 3, paragraph 44 page 3, paragraph 47 page 16, paragraph 241 - paragraph 243; figure 8 | 1-9, 11-19, 21 10, 20 |
| Y A | WO 97 16021 A (SARNOFF DAVID RES CENTER) 1 May 1997 (1997-05-01) abstract page 10, line 19 - page 11, line 8 page 11, line 17 - line 20 -/- | 1-9, 11-19, 21 10, 20 |

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | US 6 314 452 B1 (OVSIANKIN ALEXANDER ET AL) 6 November 2001 (2001-11-06) column 1, line 57 -column 2, line 20 --- | 3,4,13, 14 |
| A | EP 0 961 494 A (SHARP KK) 1 December 1999 (1999-12-01) abstract page 4, line 11 -page 5, line 1 --- | 3,13 |
| A | US 5 619 998 A (ABDEL-MALEK AIMAN A ET AL) 15 April 1997 (1997-04-15) abstract column 2, line 35 - line 45; figure 2 column 6, line 5 - line 10 column 6, line 42 - line 53 --- | 1-21 |
| A | US 5 764 807 A (SAID AMIR ET AL) 9 June 1998 (1998-06-09) cited in the application the whole document --- | 1-21 |
| A | WO 98 40842 A (COMPUTER INFORMATION AND SCIEN) 17 September 1998 (1998-09-17) abstract page 4, line 13 - line 26 page 18, paragraph 2 page 19, last paragraph page 45, line 16 - line 36; figure 8 page 50, line 1 -page 51, line 12; figure 49 ----- | 1-21 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/01545

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|----|---------------------|---|--|
| US 2001024529 | A1 | 27-09-2001 | AU 6863998 A WO 9840842 A1 US 2002006229 A1 | 29-09-1998 17-09-1998 17-01-2002 |
| WO 9716021 | A | 01-05-1997 | EP 0857389 A1 JP 11513874 T WO 9716021 A1 US 6298167 B1 US 6483946 B1 | 12-08-1998 24-11-1999 01-05-1997 02-10-2001 19-11-2002 |
| US 6314452 | B1 | 06-11-2001 | AU 7077600 A EP 1218824 A1 WO 0116764 A1 | 26-03-2001 03-07-2002 08-03-2001 |
| EP 0961494 | A | 01-12-1999 | JP 3213561 B2 JP 10224788 A EP 0961494 A1 US 6529636 B1 WO 9835502 A1 | 02-10-2001 21-08-1998 01-12-1999 04-03-2003 13-08-1998 |
| US 5619998 | A | 15-04-1997 | US 5497777 A | 12-03-1996 |
| US 5764807 | A | 09-06-1998 | NONE | |
| WO 9840842 | A | 17-09-1998 | AU 6863998 A WO 9840842 A1 US 2001024529 A1 US 2002006229 A1 | 29-09-1998 17-09-1998 27-09-2001 17-01-2002 |